

## Abstract of the Disclosure

An optical spectrum analyzer (OSA) 10 sequentially or selectively samples (or filters) a spectral band(s) 11 of light from a broadband optical input signal 12 and measures predetermined optical parameters of the optical signal (e.g., spectral profile) of the input light 12. The OSA 10 is a free-space optical device that includes a collimator assembly 15, a diffraction grating 20 and a mirror 22. A launch pigtail emits into free space the input signal through the collimator assembly 15 and onto the diffraction grating 20, which separates or spreads spatially the collimated input light, and reflects the dispersed light onto the mirror 22. A  $\lambda/4$  plate 26 is disposed between the mirror 22 and the diffraction grating 20. The mirror reflects the separated light back through the  $\lambda/4$  plate 26 to the diffraction grating 20, which reflects the light back through the collimating lens 18. The lens 18 focuses spectral bands of light ( $\lambda_1 - \lambda_N$ ) at different focal points in space. One of the spectral bands 11 is focused onto a receive pigtail 28, which then propagates to a photodetector 30. A pivoting mechanism 34 pivots the diffraction grating 20 or mirror 22 about a pivot point 36 to sequentially or selectively focus each spectral band 11 to the receive pigtail 28. A position sensor 42 detects the displacement of the diffraction grating 24 or mirror.